

BUNN® TECHNICAL TRAINING

AXIOM®



Index

Unit 1: Installation

Site Requirements	4
Location of the Serial Number	4
Install Preparation	4
Water Supply Install	4
Electrical Install	5
Initial Start-Up	5

Unit 2: Setup

User Interface (Programming)	7
Programming Lockout	7
Programming Menus	8
Level 1 Programming (BrewWIZARD®)	8
Level 2 Programming	8
Level 3 Programming	10
Machine Setup	10
Brew Oz	10
Calibrating Flow Rate	11
Enable BrewLOGIC®	11
Calibrate Temperature Probe	12
Setting Lime Adjustment	12
Resetting Refill Threshold	13

Unit 3: Machine Composition

Exterior Overview	15
Product Outlets and Removable Parts	15
User Interface (Operating)	15
Accessing the Inside of the Brewer	16
Machine Function and Operations	16
Main Control Board	16
Filling System	16
Heating System	17
Dispensing System	18

Unit 4: Preventive Maintenance

Preventive Maintenance	20
PM Steps	20

Unit 5: Troubleshooting

Service Tools	23
Test Outputs	23
Test Switches	24
Service Fault Messages	24
Troubleshooting Components	25
Troubleshooting Refill, Heating & Brewing Systems	28
Triac Map	30
Schematics	31
Additional Resources	34



Unit Objectives

Given a realistic scenario depicting a new site install, the learner will be able to install and setup the brewer for customer turnover without error.

Given a new machine, all the necessary tools and safety equipment, the learner will be able to install the brewer without error.

The learner will be able to verify that the site requirements have been met.

The learner will be able to locate and document the serial number.

The learner will be able to hook up the water supply.

The learner will be able to hook up the electrical supply.

The learner will be able to power on the machine.

Installation

Site Requirements

Space
<ul style="list-style-type: none">• Counter able to support the weight of the equipment• AXIOM® (2 top warmers) approx. dimensions (H 18.9 x W 8.5 x D 17.7)• AXIOM® (3 lower warmers) approx. dimensions (H 16.8 x W 16.5 x D 17.7)• AXIOM® (4/2 Twin) approx. dimensions (H 19.1 x W 16.4 x D 17.7)• AXIOM® (0/6 Twin) approx. dimensions (H 20.5 x W 30.3 x D 17.7)
Plumbing
<ul style="list-style-type: none">• AXIOM® (Single) 1/4" flare water connection• AXIOM® (Twin) 3/8" flare water connection• A shut-off valve should be installed in the line before the machine• Connected to cold water• Dynamic water pressure 20-90psi, set to 50psi if regulator is needed
Electrical
<ul style="list-style-type: none">• 120VAC with a dedicated 20 amp circuit with proper breaker and receptacle• 120/208-240VAC with a dedicated 20 amp circuit with proper breaker and receptacle 3 wire + ground (neutral, L1, L2, ground)

Location of the Serial Number

The machine's serial number is located on the data plate which is attached to the bottom of the front panel. The serial number begins with the letters AX. The complete serial number will need to be documented on all work orders and warranty tags.



Install Preparation

- Step 1:** Determine the electrical availability at site.
- Step 2:** Using a volt meter check voltage and color coding for each conductor on wall outlet.
- Step 3:** Factory installed power cord is 120VAC 15 amp. Unless ordered as 208-240VAC.
- Step 4:** If 208-240VAC power is used remove front panel and locate the main terminal block. Remove the 120VAC power cord.
- Step 5:** Feed new power cord thru the rear of the machine.
- Step 6:** Install leads to the main field wiring terminal block.
- Step 7:** Select desired voltage to be used by moving the selector switch. Switch is located in the upper most area of the front of the brewer with the front panel removed.
- Step 8:** Place the AXIOM on a solid flat surface insuring it is level front to rear and side to side using a level, adjust legs as needed.

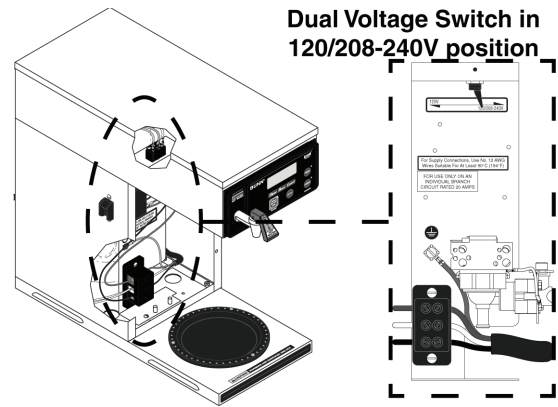
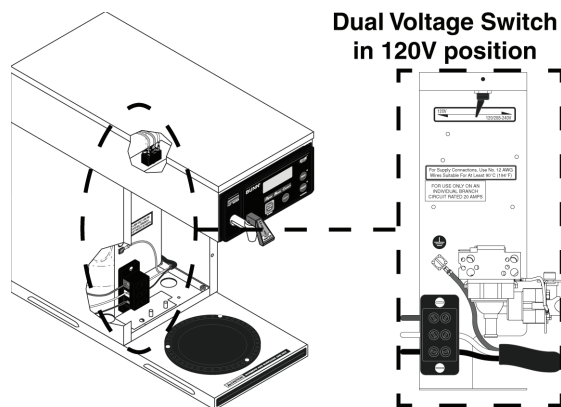
Water Supply Install

- Step 1:** Check dynamic water pressure, install a pressure regulator and set to 50 psi for pressures exceeding 90 psi or if excessive pressure fluctuations.
- Step 2:** Flush water lines and filter if used
- Step 3:** Install shut-off valve.
- Step 4:** Attach the water line to the flare fitting of the machine.
- Step 5:** Turn on water and check for leaks.

Electrical Install

An electrician must provide electrical service as specified in conformance with all local, state, and federal electrical codes.

Step 1: Plug the unit into the power source.



Initial Start-Up

- Step 1. Insert an empty funnel into the funnel rails.
- Step 2. Place an empty server under the funnel.
- Step 3. Connect the brewer to the power source.
- Step 4. Turn master on/off switch to the on position, located on the side or rear of the machine if equipped.
- Step 5. Press and release the BrewOn/Off Switch. Water will flow into the tank and stop when the tank is filled to its capacity. Display will show "PLEASE WAIT...TANK FILLING" until tank is filled with water.
- Step 6. Wait approximately twenty minutes for the water in the tank to heat to the proper temperature. Display will show "READY TO BREW...WATER TEMP: 200°" when tank is at operating temperature. Some water will drip from the funnel during this time; this is due to expansion and should not occur thereafter.
- Step 7. Place a small container beneath the faucet and open the faucet handle. Release it when you hear the tank refilling.
- Step 8. Water volumes and flow settings have been preset at the factory. Refer to adjustments for the Set Brew Ounces section of this manual should the volume need to be increased or decreased.
- Step 9. The brewer is now ready for user setup.
- Step 10. Repeat steps 5-9 for remaining side on Twins.

Brew water temperature is factory set at 200°F (93.3°C). Areas of high altitude will require lowering this temperature to prevent boiling. This chart should be used as a guide when re-adjusting the brew water temperature.

Altitude (Feet)	Boiling point of water		Recommended water temperature	
	° F	° C	° F	° C
-1000	213.8	101.0	200	93.3
-500	212.9	100.5	200	93.3
0	212.0	100.0	200	93.3
500	211.1	99.5	200	93.3
1000	210.2	99.0	200	93.3
1500	209.3	98.5	200	93.3
2000	208.4	98.0	200	93.3
2500	207.4	97.4	200	93.3
3000	206.5	96.9	199	92.8
3500	205.6	96.4	198	92.2
4000	204.7	95.9	197	91.7
4500	203.8	95.4	196	91.1
5000	202.9	94.9	195	90.6
5500	201.9	94.4	195	90.6
6000	201.0	93.9	194	90.0
6500	200.1	93.4	193	89.4
7000	199.2	92.9	192	88.9
7500	198.3	92.4	191	88.3
8000	197.4	91.9	190	87.8
8500	196.5	91.4	189	87.2
9000	195.5	90.8	188	86.7
9500	194.6	90.3	187	86.1
10000	193.7	89.8	186	85.6



UNIT 2 SETUP

Unit Objectives

Given a realistic scenario depicting a new site install, the learner will be able to install and setup the brewer for customer turnover without error.

Given an installed machine, all the necessary tools and safety equipment, the learner will be able to set the machine up for initial operation.

The learner will be able to enter programming.

The learner will be able set the appropriate brew ounces.

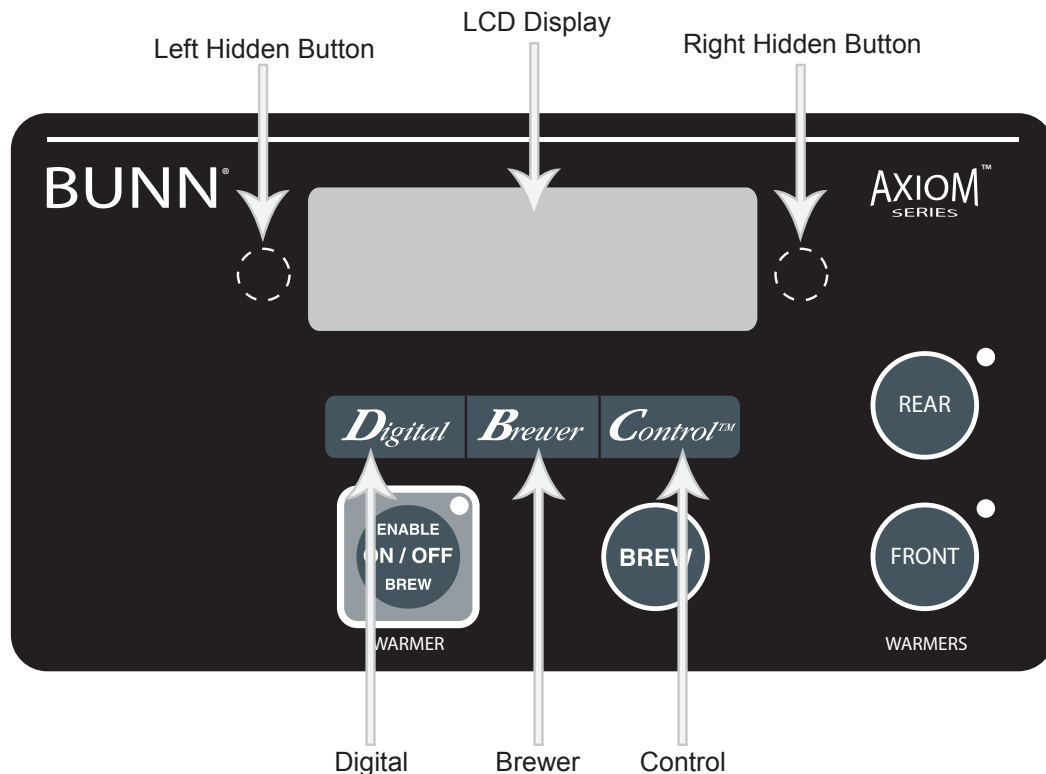
The learner will be able to calibrate the sprayhead flow rate.

The learner will be able to enable BrewLOGIC® and explain when it may be necessary.

Setup and Programming

As with all BUNN® digital brewers the equipment has been designed for ease of use for both the end user as well as service technicians alike. End users have an opportunity to see the status of the equipment during idle time or during a brew cycle. It is technician friendly, as with any LCD display equipment BUNN® manufactures, allowing for step by step calibrations, diagnostic functions as well as quick adjustments to name a few. The AXIOM™ has gone one step beyond, by providing cutting edge technology by monitoring outflow rates of water exiting the brew tank therefore allowing the control board the opportunity to adjust pot levels by increasing or decreasing the brew time needed during a brew cycle. Resulting in perfect pot levels every time.

User Interface (Programming)



Display: The display shows the various functions.

Right Hidden Button: This is used to access the program mode and is also used to step forward through the menu.

Left Hidden Button: This is used to step backwards through the function list.

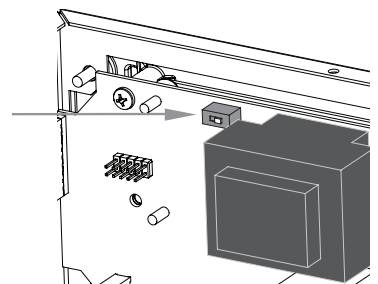
Digital (lower left under the display): This is used to select options that appear on the display during programming.

Brewer (center under the display): This is used to select options that appear on the display during programming.

Control (lower right under the display): This is used to select options that appear on the display during programming.

Programming Lockout

If the programming cannot be accessed, then the programming lockout switch is in the Disable position. The switch is located on the control board. Remove the top panel, locate the switch and place it into the Enable position.



Programming Menus

The programming menus for the AXIOM® are divided into three levels. Level 1, (BrewWIZARD®), allows for basic brewing adjustments. Level 2 is used for more advanced brewing adjustments in addition to supporting service and diagnostic functions. The final level of programming, Level 3, is where you can find advanced screens such as; Cal Temperature, Lime Adjust, and Calibrate LP1-LP2.

While in programming you may exit and save any changes you have made by pressing and releasing the Enable On/Off switch located on the front panel.

Level 1 Programming (BrewWIZARD®)

Press and hold the right hidden switch until the screen reads Brew Lockout? to enter programming.

BREW LOCKOUT ?
NO DONE YES

This function will lockout an operator if a predetermined temperature has not been achieved message will read "Brew temp to low please wait heating".

BREW OZ: 64.0
(-) DONE (+)

This function allows the operator to adjust the brew volumes for the various sizes of holding vessels.

BREW METER 3
- IIII +

This function allows the operator to adjust the brew strength/extraction time setting 1 is non pulse setting, 14 being the highest setting using pulse brew.

ENABLE ADS ?
NO DONE YES

This screen allows the operator to utilize the screen for advertising; a tag card can be programmed with a message.

ENTER SERVICE # ?
NO YES

This function allows the operator to enter in a telephone number to call if service is needed. This number will be displayed anytime a fault message appears.

EXITING
BrewWIZARD

This display is a prompt to advise you that you are exiting Level 1 programming.

Level 2 Programming

Level 2 programming can only be accessed by scrolling through Level 1 programming.

ENTER PASSWORD
0 0 0

This function allows the operator to enter a 3 digit code to password protect Level 2 programming.

SET PASSWORD
0 0 0

This function allows the operator to set a 3 digit code to password protect Level 2 programming.

SET LANGUAGE
NO YES

This function allows the operator to choose between English, Spanish and French.

UNITS
METRIC DONE ENG

This function allows the operator to choose between English or Metric.

SET TEMP 200° (-) DONE (+)	Adjust the target temp of the Brew tank. Range of 185°F to 205°F.
SET READY 195° (-) DONE (+)	This function sets the minimum temperature to start a brew cycle (BREW LOCKOUT). Range of 2°F min. to 20°F max. below the Set Temp.
ENTER ASSET # ? NO YES	This display allows an optional asset number or tracking number to be assigned.
SET PULSE BREW ? NO YES	This function allows the sprayhead to “pulse on and off” during the brew cycle.
DRIP TIME 0:30 (-) DONE (+)	This function will adjust the amount of time the display will read “Dripping” after a brew cycle is completed.
ENABLE CLEAN NO DONE YES	This display allows for a cleaning alert to be displayed (range of 1 to 30 days).
Enabl Energy Savr NO DONE YES	This function allows the tank heater(s) to run at a reduced rate during idle time.
Enable Fresh Timer NO DONE YES	This function allows a “Freshness Alert” message to display when a pre determined time has elapsed from the last brew. Range 0.5 – 4.0 hrs.
ENABL WARMER OFF NO DONE YES	This function allow for auto warmer turn off after a pre determined time has been entered. Range 15 mins. To 6.0 hours.
XXX REFILL 155 (-) DONE (+)	This function adjusts sensitivity of the refill circuit.
ENABLE BrewLOGIC NO DONE YES	This function allows the brewer to be calibrated in high lime locations and compensate automatically as deposits build up in the equipment.
SPRAY OZ/M: 25.0 (-) DONE (+)	This is used to tell the internal controller how fast the water is flowing.
CALIBRATE FLOW ? NO YES	This function provides a 60 second test mode to capture water from the sprayhead. This measurement will then give you the numbers to enter into the “SPRAY OZ/M: xx” screen above. Will not display when BrewLOGIC® is enabled.
BREW COUNTERS ? NO YES	Tracks the total number of brew cycles completed.

SERVICE TOOLS ?**NO YES**

Allows the testing of individual components and the ability to check the membrane switches for proper function.

FACTORY DEFAULTS**NO YES**

Reset all of the previously entered brew settings, ad message, calibrations, etc.

Level 3 Programming

To access Level 3 programming press and hold the right hidden button, until the screen reads Cal. Temperature, while on the Enter Password screen in Level 2 of programming.

CAL TEMPERATURE**NO SENSOR? YES**

This function allows the operator to “recalibrate” the CPU to the temperature thermistor. This must be preformed when you replace a CPU or a thermistor.

% Lime Adjust OFF**(-) DONE (+)**

This function allows for automatic adjustment of brew cycle times based on the output of the sprayhead.

LP1 → LP2 OZ 4.50**(-) DONE (+)**

This function is used for calibration of the water volumes from the long level probe to the short level probe.

SPRAY OZ/M: 25.0**(-) DONE (+)**

This is used to tell the internal controller how fast the water is flowing.

CALIBRATE FLOW ?**NO YES**

This function provides a 60 second test mode to capture water from the sprayhead. This measurement will then give you the numbers to enter into the “SPRAY OZ/M: xx” screen above. Will not display when BrewLOGIC® is enabled.

Machine Setup**Brew Oz.**

It is necessary to setup the desired Brew Oz., due to the different size containers available in the market.

To convert liters to ounces use this simple math equation.

$$\text{Liters} \times 33.9 = \text{ounces}$$

For example if you were using a 3.0L airpot this is what your equation would look like.

$$3.0 \times 33.9 = 101.7 \text{ rounded up to } 102 \text{ fluid US ounces.}$$

Step 1: Enter programming Level 1, (BrewWIZARD®).

Step 2: Scroll to the Brew Oz. screen.

BREW OZ: 64.0**(-) DONE (+)**

Step 3: Use the (-) or (+) to enter Oz. the desired ounces for the container to be used.

Calibrating Flow Rate

Prior to programming the machine or brewing any coffee a flow rate calibration must be done. Flow rates will vary from machine to machine, location to location, even from one end of a building to another.

Step 1: Enter Level 2 programming.

Step 2: Scroll to the Calibrate Flow screen. This test is used to capture water from the sprayhead during a pre-determined 60 second dispense valve cycle.

CALIBRATE FLOW ?

NO YES

Step 3: Ensure the sprayhead and funnel are in place and put a container, measuring pitcher or server, underneath the funnel, select Yes.

CONTAINER RDY ?

QUIT YES

Step 4: To activate the flow rate check, press the Brew button.

Step 5: The valve will open for 60 seconds. Once all of the water has dripped out, use the (-) or (+) buttons to input the volume collected and select Done.

ENTER OZ: 24.5

(-) DONE (+)

It is very important to be accurate when performing this test as it will control the pot level during normal operation.

Enable BrewLOGIC® (Optional)

BrewLOGIC® is a system that monitors output of water flow from the tank. This can be helpful when the equipment is placed in a high lime environment. As the flow rate begins to slow the system will compensate by increasing brew times as needed to maintain the proper pot levels. If enabled, the Calibrate Flow screen will not be visible.

Step 1: Ensure the brewer is in it's final location and is level.

Step 2: Enter Level 2 programming.

Step 3: Scroll to Enable BrewLOGIC® and select Yes.

ENABLE BrewLOGIC

NO DONE YES

Step 4: On the Calibrate Now? screen select Yes.

CALIBRATE NOW ?

NO YES

Step 5: The display will now read Too Hot-Will Cool Tank Now, the change to Press Brew When Ready, (with brew funnel and container in place). The tank temperature must be in this range 130°F to 170°F, to perform the calibration.

**TOO HOT - WILL
COOL TANK NOW**

Step 6: The display will read Cooling Tank Please Wait. Once the tank temperature is within the acceptable range the display will read, Container Ready?. Place an empty container beneath the funnel and select Yes.

CONTAINER RDY ?

QUIT YES

Step 7: The display will read Calibrate Spray, press brew start the calibration.

**CALIBRATE SPRAY
PRESS BREW START**

Step 8: WaitingTilCycle 4 the display will indicate cycles complete.

**WaitingTilCycle4
CYCLE 1 COMPLETE**

Step 9: Use the Digital (-) switch and Control (+) switch to adjust total volume captured. Press Done when finished.



Lime Adjustment

The "% Lime Adjust" menu is an adjustable percentage that you can modify to allow for lime compensation (flow-rate) when BrewLOGIC is enabled. The "% Lime Adjust" menu can be found in level 3 programming. The default value for Lime Adjust is set at 10%.

**% LimeAdjust ON
(-) DONE (+)**

Smaller Percentage - less tolerant of the sprayhead flow-rate before compensation of brew time.

Higher Percentage - more tolerant of the sprayhead flow-rate before compensation of brew time.

To Access and Modify the Lime Adjust:

1. Enter level 2 programming by depressing the right hidden button for 5 seconds. This display screen should read "Enter Password".
2. Press and release the right hidden switch until the display screen reads "Enter Password".
3. Press and hold the right hidden switch until the display screen reads "Calibrate Temp Sensor?". Once this occurs, you have reached level 3 programming.
4. Press and release the right hidden switch until the display screen reads "% Lime Adjust".
5. Use the Digital (-), Brewer (Done), and Control (+) switches to make adjustments to this setting.

Calibrating the Temperature Sensing Probe

Note: Calibrating the temperature sensing probe (thermistor) should be done when replacing the CBA or thermistor. Allow the tank to heat the water to the ready temperature. No tests should be taken while the tank is heating as the tank temperature must be stable before any readings are recorded.

Step 1: Remove the top panel of the machine.

Step 2: Gain access to the water in the tank, the thermistor grommet can be removed (keep the thermistor in contact with the water.)

Step 3: Place the probe of a digital thermometer into the water and measure the temperature.

Step 4: Verify and record the temperature of the water.

Step 5: Access level 3 programming and navigate to "Cal Temperature Sensor?" menu screen. Select Yes.

Step 6: Use the Digital (-) and Control (+) switches to enter the temperature that you recorded from the digital thermometer reading.

**CAL TEMPERATURE
NO SENSOR? YES**

Setting the Refill Threshold

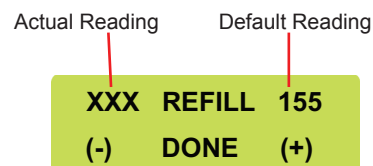
The refill setting in programming is a conductivity based system. It is a reading that is generated by the liquid level probe and the conductivity of the water in the tank has a total range of 0 - 255 (this can be viewed on the Refill program screen). The lower the reading, the more conductance is being sensed. Conversely, the higher the reading, the less conductance. Theoretically it would read 0 when the probe touches the water, and 255 when it is not touching the water. However, due to water conditions and conditions in the tank, it may not have these exact readings. The programmable portion of the system is the “switching point” (or threshold). This is typically set to 155 (your default value). When the probe reading is less than this programmed number, it will be viewed as not requiring water from the refill system. When it is the number or greater, it will be viewed as needing water.

If this threshold is causing problems, there's a simple way to determine the optimum switching point.

Step 1: With water known to be touching the liquid level probe, record the probe reading that is present on the Refill program screen (it will show the programmed threshold and the actual reading, here we want the actual reading).

Step 2: Now create a situation where it is known the water is not touching the probe (can raise the probe out of the tank). Record the probe reading.

Step 3: With the 2 readings, set the programmed threshold to be exactly half-way between the 2 numbers.





UNIT 3 MACHINE COMPOSITION

Unit Objectives

Given a realistic scenario in which the learner has access to the machine's internal components the learner will understand the composition and functions of the brewer.

Given a realistic scenario requiring the learner to access the internal components of the machine the learner will be able to remove the front panel and top cover.

The learner will disconnect the electrical and water supply.
The learner will remove the front panel and top cover.

Given an operating machine the learner will be able to give a general explanation of how the unit operates.

The learner will be able to identify the functions of the main control board and identify the components that correspond to each triac.

The learner will be able to identify the components and functions of the filling system.

The learner will be able to identify the components and functions of the heating system.

The learner will be able to identify the components and functions of the dispensing system.

The learner will be able to identify the components and functions of the coffee holding system.

Machine Composition

Exterior Overview

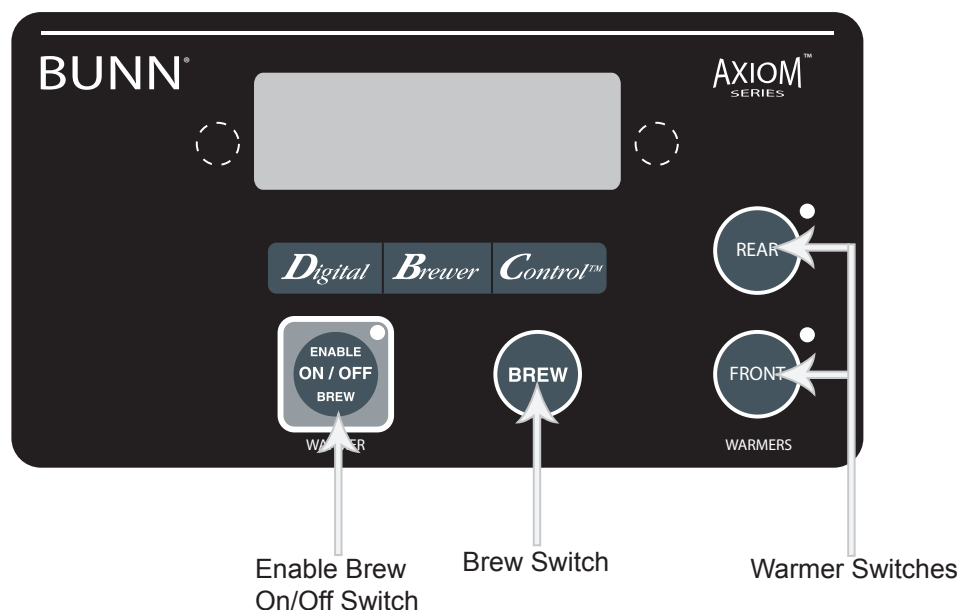
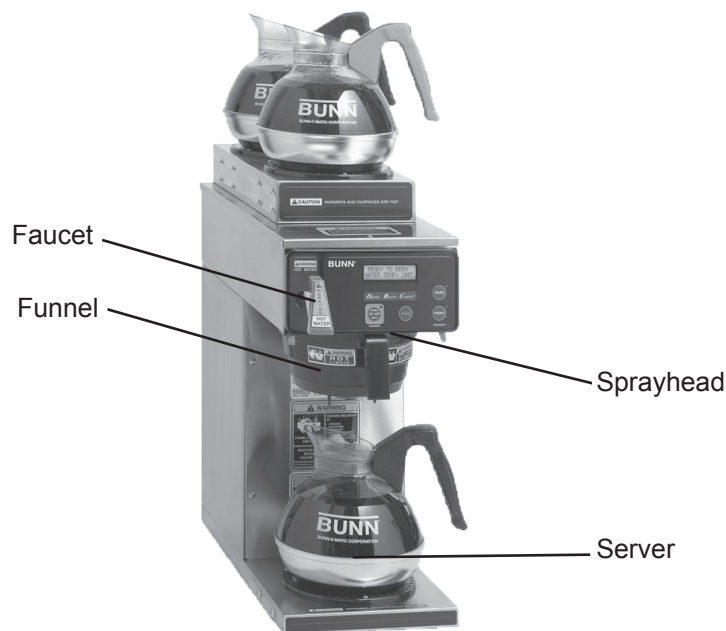
Product Outlets and Removable Parts

- Faucet assembly
- Sprayhead
- Funnel
- Server

User Interface (Operating)

The user interface on the AXIOM® consists of a membrane switch adhered to the front of the brewer. The membrane is connected to the main control board by a ribbon cable. This membrane allows the user to select a brew cycle in addition to control the warmer plates depending on model type.

The display is also located in the front of the machine it is mounted to the main board. By showing what the status of the machine the display aids the operator and technicians.



Enable Brew On/Off Switch: Pressing the “Enable Brew On/Off” switch (indicator on) supplies power to the brew station warmer, enables the brew circuit, and energizes the tank refill circuit. Pressing the switch again (indicator off) stops tank refilling and brewing and de-energizes the brew station warmer. Stopping a brew cycle after it has been started will not stop the flow of water into the server until the brew funnel is empty.

Note: Hot water will be available at the faucet in a limited amount when the “Enable Brew On/Off” switch is in the “Off” position because the tank will not refill.

Brew Switch: Momentarily pressing and releasing the switch starts a brew cycle when the “Enable Brew On/Off” indicator is on.

Warmer Switches: Pressing any additional warmer switch so that the indicator is on, supplies power to the associated warmer. Note: APS and TC models have no warmers.

Accessing the Inside of the Brewer

The majority of service work done on the AXIOM® brewer will require the service technician to access the inside of the unit. The brewer has two removable panels, the top panel and front panel. Depending on the service required one or both of these panels may need to be removed.

To work safely the power should be disconnected prior to removing the panels. Once removed the brewer may be re-connected to troubleshoot the machine.

Top Panel: The top panel is secured by one screw, to remove the panel remove the screw and while lifting the top slightly from the front push lightly towards the rear you can then completely remove.

Front Panel: To remove the front panel, move the server and brew basket and set aside. Remove the four screws holding the front panel on and slide panel out.

Machine Function and Operations

Main Control Board

The main control board is the brain of the brewer. In the digital AXIOM® series brewer the control board is the single component that contains all of the programming software, it interprets all data it receives from the level and temperature sensors and opens or closes various components to complete a brew cycle.

In a digital brewer the main control board takes the place of the liquid level board, timer board, and the mechanical thermostat.

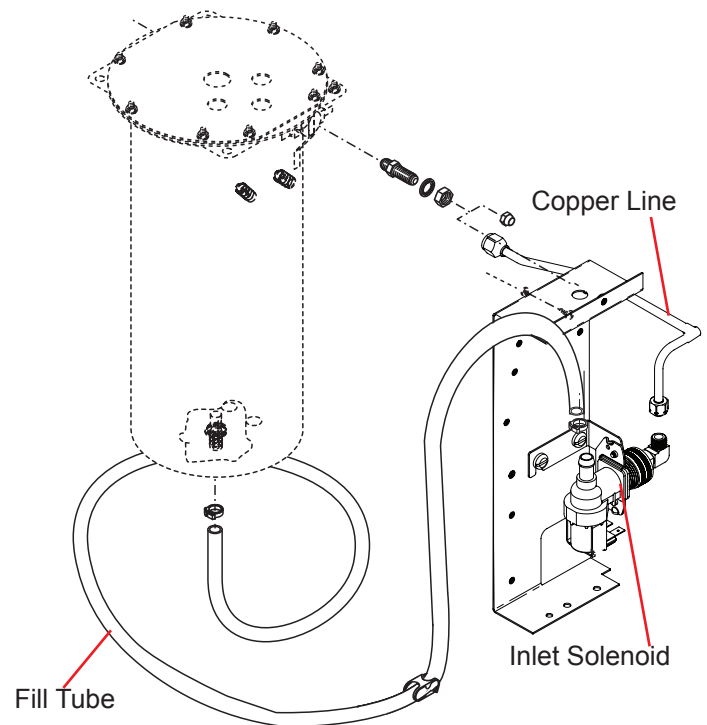
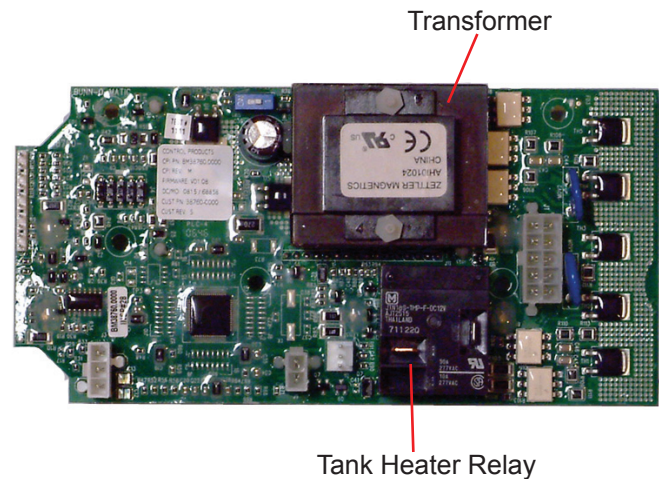
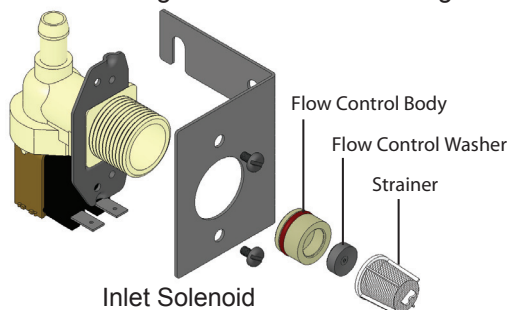
Filling System

The fill circuit consists of

- 120VAC inlet solenoid
- 2 Fill probes (referred to as Short LP1 and Long LP2)

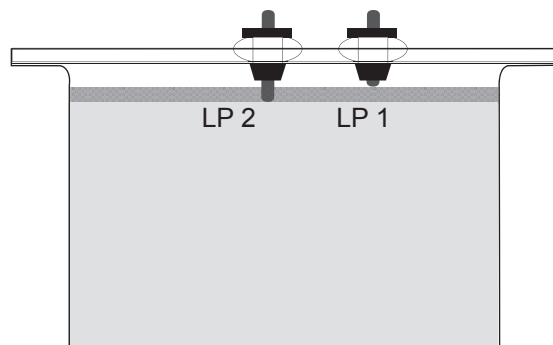
The fill system maintains the level of water in brew tank. Anytime water is drawn from the tank the fill circuit activates to refill the tank.

Water enters the brewer through the water supply line it then enters the chassis thru a copper line that is attached to the inlet solenoid. When the water enters the inlet valve it must first flow past a fine mesh screen housed within the valve, this mesh screen is designed to keep large particles of foreign material from entering the valve.



The 120VAC inlet solenoid is activated by the control board anytime the brewer calls for water. The inlet solenoid is energized to allow water to flow under line pressure. It then enters the tank through a silicone hose attached at the base of the tank.

The control board monitors the level of water in the tank through a low voltage level probe (LP2 Probe) mounted to the top of the tank. When water touches the LP2 probe, the control board grounds a low voltage AC signal to the tank through minerals in the water and the inlet solenoid is de-energized. A relay on the CBA closes it's contacts to complete the heating circuit and the heating element(s) will now receive voltage in order to heat the water in the tank. When the CBA detects water has reached ready temperature with the use of a thermistor, the tank will fill to LP1 probe level. The heating circuit will remain closed until water reaches the set tank temperature.



Heating System

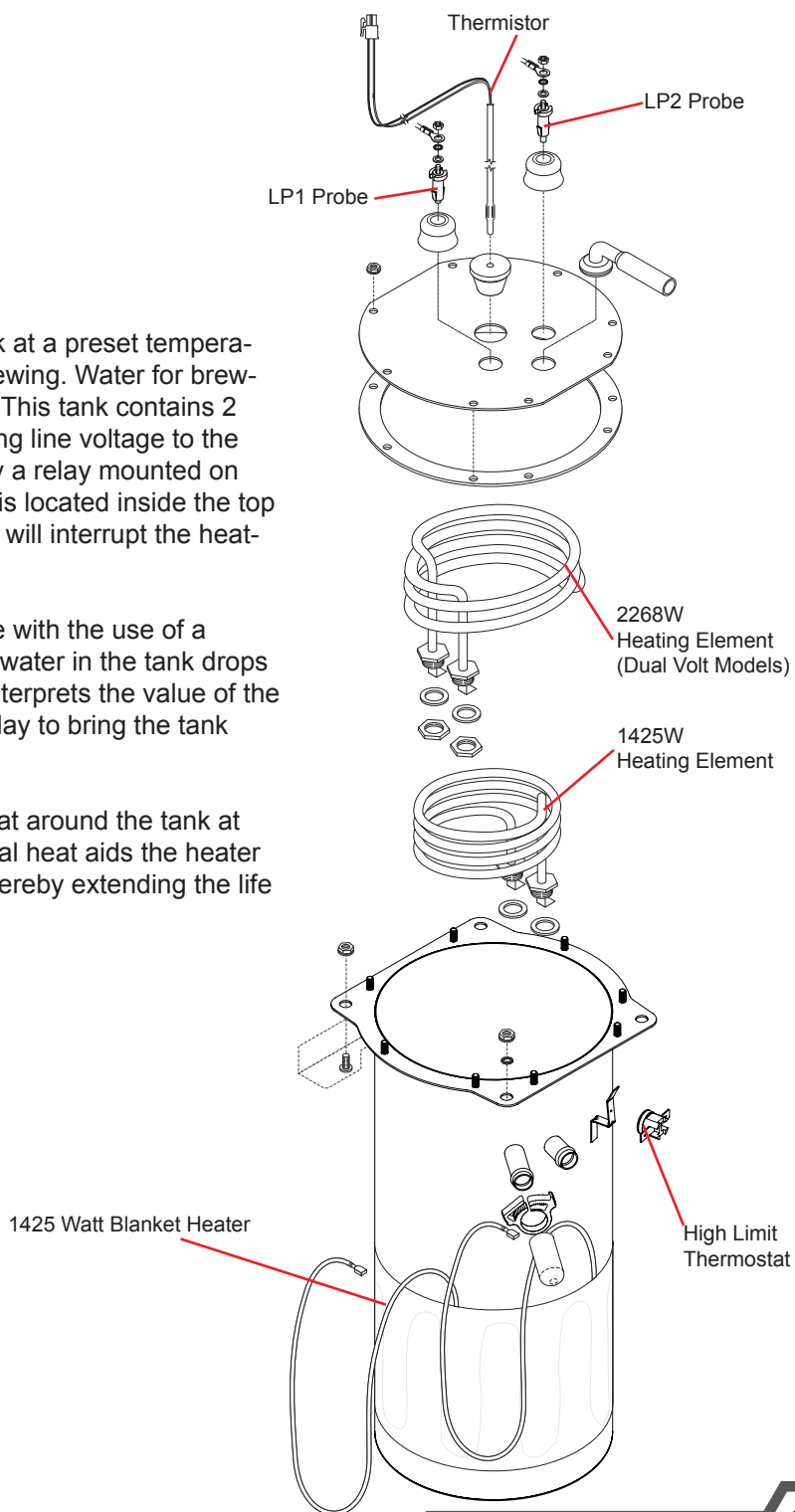
The heating system consists of:

- Water tank
- Heating elements
- Triacs
- Temperature Sensor
- Blanket Warmer

The heating circuit maintains the water in the tank at a preset temperature; this insures the water is always ready for brewing. Water for brewing is contained in a 200 oz. Stainless steel tank. This tank contains 2 heating elements that are powered by the incoming line voltage to the machine. Both heating elements are controlled by a relay mounted on the main control board. The high limit thermostat is located inside the top cover on the front of the tank, the limit thermostat will interrupt the heating circuit should the tank overheat.

The control board monitors the water temperature with the use of a thermistor that is in contact with the water. When water in the tank drops below the ready temperature, the control board interprets the value of the thermistor and in return will activate the heater relay to bring the tank temperature back up to the set tank temperature.

The blanket warmer provides a low consistent heat around the tank at the point of the temperature sensor. This additional heat aids the heater circuit by reducing the number of on/off cycles, thereby extending the life of the relay contacts and the heater.



Dispensing System

The dispensing system consists of:

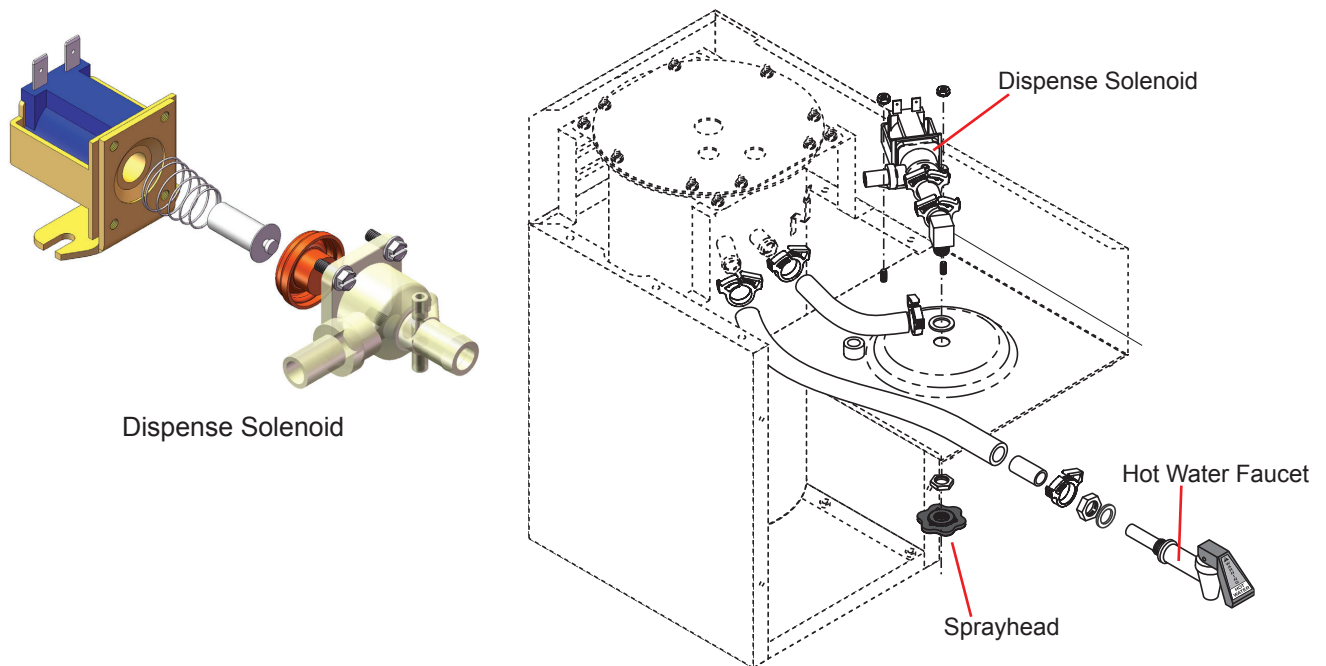
- Brew valve
- Sprayhead

The dispensing system is what makes the brewer a coffee brewer. It dispenses the hot water over a bed of coffee grounds to create the product.

The AXIOM® uses a gravity dump valve system. During the brew cycle the brew valve opens allowing water to flow from the tank and out the Sprayhead. The control board opens and closes this valve according to perimeters programmed into the control board based on a specific recipe.

While the dispensing system works much the same way as any other BUNN® gravity feed brewer. One major difference can be found that's cutting edge technology to combat lime scale buildup within the hydraulic system.

BrewLOGIC® utilizes 2 liquid level probes, as discussed earlier the long (LP2) probe performs the standard tank fill when the control board calls for water. When BrewLOGIC® is activated and calibrated as earlier discussed the tank water is monitored for "flow rate" out of the sprayhead using a mathematical algorithm that was determined during calibration. If the flow rate from the sprayhead is too slow or too fast within the first two cycles, the control board will adjust the overall brew "time" to compensate.



UNIT 4 PREVENTIVE MAINTENANCE



Unit Objectives

Given a realistic scenario depicting a machine requiring a preventive maintenance, the learner will be able to identify which elements of a component need to be serviced without error.

Given a machine, all the necessary tools and safety equipment, the learner will be able to identify the components that need to be serviced for the PM.

Preventive Maintenance

In order to maintain proper operation and long service life BUNN® recommends performing the preventive maintenance every 6 months. Individual customers will vary with some customers choosing not to receive preventive maintenance.

Tools Required:

- 2 Flat head screwdrivers (1 small, 1 medium)
- Adjustable wrench
- Needle nose pliers
- Deliming tool (BUNN P/N: 38227.0000)

Prior to servicing the brewer:

- Disconnect the electrical supply
- Shut off water supply

PM Steps

Step 1: Remove probes from tank lid.

- ☐ Remove top and front access panels
- ☐ Drain tank using drain hose located behind front panel. Caution Hot Water!!
- ☐ Remove thermistor probe (temp probe) from the top of the tank. Clean and inspect
- ☐ Remove liquid level probes (2) from tank lid clean and inspect
- ☐ Reassembly is the opposite of disassembly

Step 2: Rebuild brew valve, clean outlet fittings at tank.

- ☐ Remove wire leads from brew valve
- ☐ Carefully remove silicon hose from brew valve
- ☐ Remove mounting nuts
- ☐ Remove 4 screws from valve
- ☐ Replace plunger, spring and rubber seat using rebuild kit, (BUNN P/N: 11517.0008)
- ☐ Carefully remove the silicon hoses from the outlet tank fittings
- ☐ Clean fittings using deliming tool (long end) or suitable tool
- ☐ Reassembly is the opposite of disassembly

Step 3: Rebuild hot water faucet.

- ☐ Replace hot water seat cup by unscrewing the bonnet assembly
- ☐ Remove old seat cup
- ☐ Install new seat cup, (BUNN P/N: 02766.0000)
- ☐ Reassembly is opposite of disassembly

Step 4: Clean and inspect Sprayhead clean spray head fitting.

- ☐ Clean and inspect Sprayhead
- ☐ Clean Sprayhead fitting using deliming tool

Step 5: Inspect brew funnel for missing or loose parts.

Step 6: Inspect water connection points for signs of leakage.

Step 7: Inspect power cord.

Step 8: Return AXIOM® to service.

- ☐ Turn on water supply and check for leaks
- ☐ Plug AXIOM® in at wall receptacle
- ☐ Allow tank to fill and heat to operating temperature

Step 9: Calibrate Sprayhead.

- Enter Level 2 programming.

- Scroll to the Calibrate Flow screen. This test is used to capture water from the sprayhead during a pre-determined 60 second dispense valve cycle.

CALIBRATE FLOW ?

NO

YES

- Ensure the sprayhead and funnel are in place and put a container, measuring pitcher or server, underneath the funnel, select Yes.

CONTAINER RDY ?

QUIT

YES

- To activate the flow rate check, press the Brew button.
- The valve will open for 60 seconds. Once all of the water has dripped out, use the (-) or (+) buttons to input the volume collected and select Done.

ENTER OZ: 24.5

(-)

DONE

(+)



UNIT 5 TROUBLESHOOTING

Unit Objectives

Given a realistic scenario depicting a broken machine, the learner will be able to effectively troubleshoot, diagnosis, and repair the problem returning the machine to normal operation.

Given a machine displaying an error message, all the necessary tools and safety equipment, the learner will be able to access the software and diagnosis the problem.

The learner will be able to access the programming menu.

The learner will be able to navigate to the Service Tools menu.

The learner will be able use the Service Tools menu to test inputs or outputs.

Given a list of error messages and issues, the learner will be to identify the probable cause of the message or issue.

Given a brewer with a defective component, the learner will be able to test the component to determine the cause of the defect.

Troubleshooting and Repair

The AXIOM® brewer series features onboard troubleshooting diagnostics. Since all of the brewers components are controlled or activated by the control board all components can easily be activated for testing by user interface.

Service Tools

The Service tools option is located in level 2 programming. Enter level 2 programming by pressing and holding the right hidden switch for approximately 5 seconds. Scroll to level 2 “Service Tools” using the right hidden switch.

Press the Control button to select “Yes”. This will enter the “Service Tools” feature.

SERVICE TOOLS ?
NO YES

In the “Service Tools” selection there are 5 screens available, three of which are read only. By selecting “Yes”, when given the option, you will enter that test function, and by selecting “No” you will move to the next test.

TEST OUTPUTS?
NO YES

Test Outputs tests supplies voltage to load components in the brewer.

TEST SWITCHES?
NO YES

Test Switches tests the inputs from the membrane switches.

LP1 LP2
4 DONE 3

Read Only, indicates if water is present on one or both Level Probes.

SPRAY OZ/M: 23.4
DONE

Read Only, indicates the current calibration of the sprayhead.

LP1→LP2 OZ 4.09
DONE

Read Only, shows the total volume of water between the “Short” and “Long” probes.

Test Outputs

Test Outputs the following components can be activated for troubleshooting.

BREW VALVE
ON NEXT OFF

REFILL VALVE
ON NEXT OFF

MAIN WARMER
ON NEXT OFF

LEFT WARMER
ON NEXT OFF

LEFT FRONT WARMR
ON NEXT OFF

LEFT REAR WARMER
ON NEXT OFF

R FRONT/TOP WARMR
ON NEXT OFF

RIGHT REAR WARMR
ON NEXT OFF

TANK HEATER RELAY
ON NEXT OFF

Test Switches

TEST SWITCHES?
NO YES

NOTHING PRESSED

Test Switches this test allows for testing of all switches on the Membrane touchpad when a button is depressed the display will read the button selected. If “Nothing Pressed” appears on the display while depressing the switch the “Control Board” is not receiving a signal.



Service Fault Messages

The AXIOM® brewer features several error messages for problems occurring within the machine. These error messages will be shown on the display.

TEMPERATURE TOO LOW

Indicates water temperature has not met the ready temperature (Brew lockout enabled).

HEATING TIME TOO LONG

Indicates Tank heater failure or Control board/Thermistor failure.

FILL TIME TOO LONG

Indicates water shutoff, supply line too small or obstructed, inlet solenoid failure, on/off switch (enable/disable) switch in off position.

TEMP SENSOR OUT OF RANGE

If the control board loses contact with the temperature sensor or senses shorted connection it will display this message.

CHECK SPRAYHEAD FOR LIME

Indicates that the flow is being restricted. Check Fittings For Lime alternates with this screen.

WARNING INACCURATE FLOW

Indicates that the flow is being severely restricted. Too Much Lime Please Repair alternates with this screen.

WARNING VERY LOW FLOW

Indicates that the flow is extremely low and the blockage needs to be removed. Please alternates with this screen.

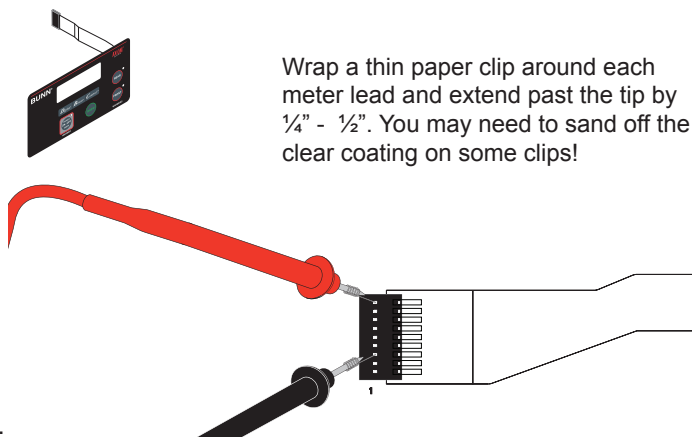
Troubleshooting Components

Membrane Switch

The membrane switch is located on the front face plate.

Test Procedures:

There are two methods for testing the membrane switch. The easiest method is to use the built in test mode. Refer to the programming section in this manual to access the Service Tools (Test Switches) menus. If for some reason you can't get into the program mode, or brewer won't power up, you can test it with an ohmmeter or continuity tester. Refer to the schematic to trace the appropriate pins.



Wrap a thin paper clip around each meter lead and extend past the tip by $\frac{1}{4}$ " - $\frac{1}{2}$ ". You may need to sand off the clear coating on some clips!

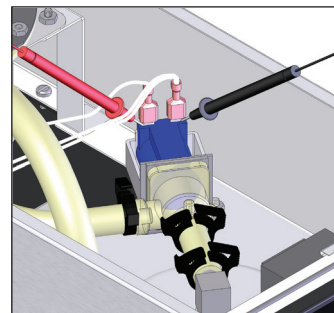
NOTE: Pin 1 is the static shield & will not provide a reading to the other pins. There are two commons in this circuit, pins 9 & 10. Disconnect brewer from power source before disconnecting ribbon cable from control board.

Brew Valve

The brew valve is located inside the top cover behind the front face plate.

Test Procedures:

1. Enter level 2 programming to access Service Tools/Test Outputs/Brew Valve.
2. Be sure brew funnel & server are in place before activating valve.
3. Check the valve for coil action. Turn on the valve with the test mode. Listen carefully in the vicinity of the brew valve for a click as the coil pulls the plunger in.
 - If no sound is heard as described, proceed to #4.
 - If the sound is heard as described, there may be a blockage in the valve, hose, tank, or sprayhead. Disconnect the brewer from the power source. Remove the valve and inspect for blockage, and de-lime all related areas.
4. Connect the voltmeter leads to the coil terminals. Turn on the valve with the test mode.



Due to the internally rectified coil, do not attempt to test this type of coil with an ohmmeter. The reading will open or very high resistance, depending on the polarity of your meter leads.

NOTE: Due to the internally rectified coil, the indication will be 120VAC all the time. Set the meter to DC volts. The indication should be 170VDC when activated. If the polarity of meter leads are reversed, reading will indicate -170VDC. (Double these readings for 240 volt coils)

- If voltage is present as described, but no coil action is observed, brew valve is defective. Replace valve and test again to verify repair.
- If voltage is not present as described, refer to Wiring Diagrams and check the brewer wiring harness. Also check the control board and switch for proper operation.

Liquid Level Probe System

The level probes are located inside the tank lid.

Test Procedures:

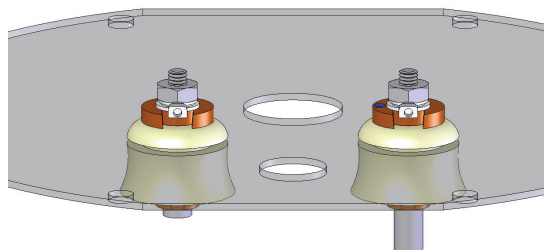
1. Enter programming level 2, scroll to "Refill".

NOTE: This screen only reads the long probe (blue wire) and is used for setting the refill conductance threshold.

Alternate: Scroll to "Service Tools".

Then scroll to "LP1 & LP2". LP1 = short probe, LP2 = long probe.

2. A high reading (approximately 255) indicates water is not touching, or not conductive enough to ground the circuit. A low reading (0-2) indicates the probe is grounded.

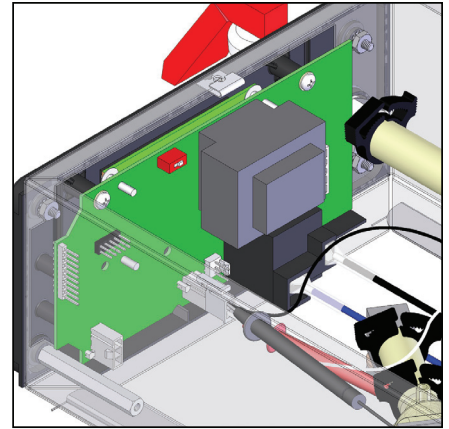


Temperature Probe

The temperature probe is inserted through the tank lid assembly.

Test Procedures:

1. Connect the brewer to the power source.
2. With a DC voltmeter, check voltage across the two wires at J9 on control board (Blackprobe to black wire, red probe to white wire. The indication should be approximately between 4vdc cool to 1vdc at ready temperature.
3. Disconnect the brewer from the power source.
 - If voltage is present as described, circuit is working correctly, check high limit thermostat (and TCO on 230V models).
 - If voltage is not present as described, proceed to #4.
4. Disconnect temperature probe from J9 on control board. Check the resistance across the two terminals of the temperature probe. The indication should be approximately between 10.5K cool to 870 at ready temperature.
 - If resistance is to specification, replace the control board.
 - If resistance is not to specification, replace the temperature probe.

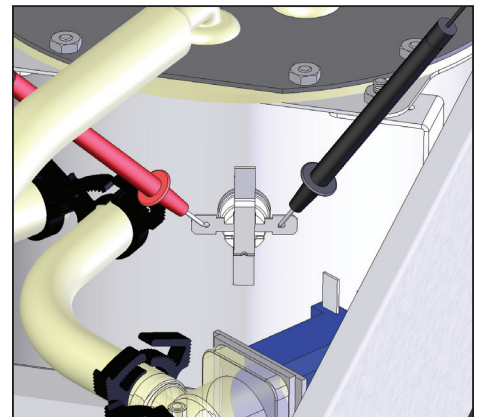


High Limit Thermostat

The limit thermostat is located inside the top cover on the front side of the tank.

Test Procedures:

1. Disconnect the brewer from the power source.
2. Disconnect the wires from the limit thermostat.
3. With an ohmmeter, check for continuity across the limit thermostat terminals.
 - If continuity is present as described, the limit thermostat is operating properly.
 - If continuity is not present as described, replace the limit thermostat.

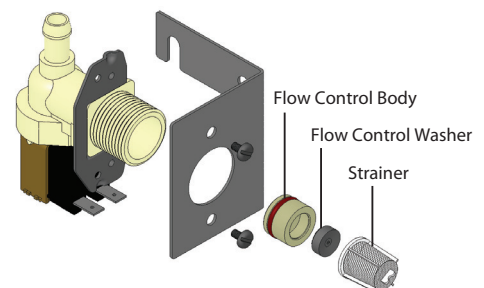


Refill Valve

The refill valve is located inside the front of the brewer.

Test Procedures:

1. Enter programming level 2, scroll to "Service Tools" then scroll to "Refill Valve".
2. Briefly activate the refill valve in the test mode. With a voltmeter, check the voltage across the coil wires.
3. The indication must be 120 volts ac for two wire 120 volt models and three wire 120/208 -240 volt models or 230 volts ac for two wire 230 volt models.
 - If voltage is present, proceed to # 4.
 - If voltage is not present, refer to Wiring Diagrams and check main wiring harness. If harness checks ok, replace control board.
4. Check the refill valve for coil action. Briefly activate the refill valve in the test mode and listen carefully near the refill valve for a "clicking" sound as the magnetic coil pulls the plunger in.
 - If the sound is heard as described and water will not pass through the refill valve, there may be a blockage in the water line before the refill valve or, the solenoid valve may require inspection for wear, and removal of waterborne particles.
 - If the sound is not heard as described, proceed to # 5.
5. Disconnect the brewer from the power source.
6. Check for continuity across the refill valve coil terminals.
 - If continuity is not present as described, replace the refill valve.
 - If continuity is present as described, there could be some debris in the valve.



Tank Heaters

The tank heaters are located inside the tank and secured to the tank bottom.

Test Procedures:

1. With a voltmeter, check voltage across the white wire (120V Models) or red wire (120/208-240V Models) from the terminal block and black wire from the control board. Connect brewer to the power source. The indication must be 120 volts ac for two wire 120 volt models or 208-240 volts ac for three wire 120/208-240 volt models (during a heating cycle).

2. Disconnect the brewer from the power source.

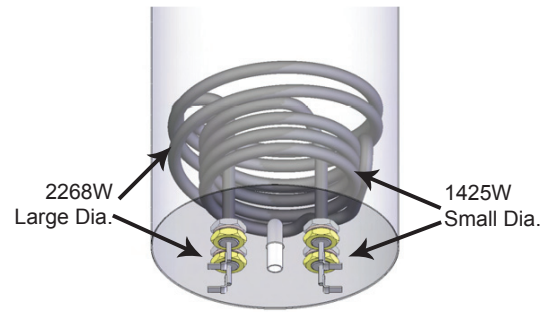
- If voltage is present as described, proceed to #3.
- If voltage is not present as described, refer to the Wiring Diagrams and check wiring harness. If harness checks ok, replace control board.

3. Disconnect the wires from the tank heater terminals.

4. Check resistance value across tank heater terminals and compare to chart.

- If resistance is present as described, reconnect the wires, the tank heater is ok.
- If resistance is not present as described, replace the tank heater.

NOTE- If any resistance is read between sheath and either terminal, remove and inspect heater for cracks in the sheath.



HEATER	RESISTANCE
1425W-120V	10.10
3500W-240V	16.46
1850W-240V	31.14
3500W-200V	11.43
3000W-240V	19.20
2268W-240V	6.35
TERMINAL TO SHEATH - INFINITE (OPEN)	

Blanket Warmer

The blanket warmer is wrapped around the tank assembly.

Test Procedures:

1. Disconnect the brewer from the power source.

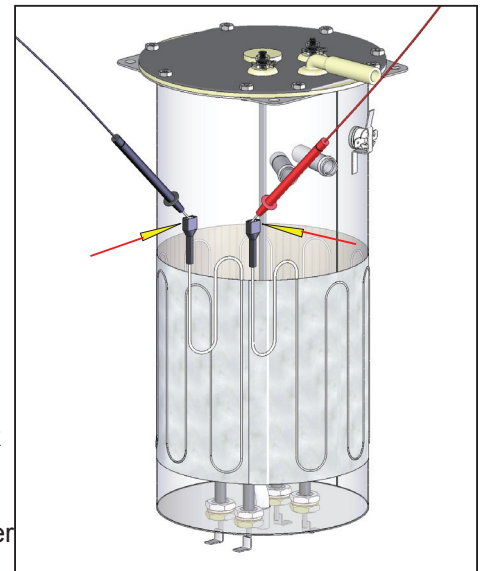
2. With a voltmeter, check voltage across the two wires at the warmer element with the "ON/OFF" switch in the "ON" position. Connect the brewer to the power source. The indication must be 120 volts ac for two wire 120 volt models and three wire 120/208 and 120/240 volt models, or 230 volts ac for two wire 230 volt models.

3. Disconnect the brewer from the power source.

- If voltage is present as described, proceed to #4.
- If voltage is not present as described, refer to Wiring Diagrams and check wiring harness.

4. Check the resistance across the two terminals on the blanket warmer. Refer to chart below.

- If resistance is to specification, reconnect the two wires to the blanket warmer.
- If resistance is not to specification, replace the blanket warmer.



WARMER	RESISTANCE
50W-120V	288.0 Ω
50W-220V	968.0 Ω

Troubleshooting the Refill Circuit

PROBLEM	PROBABLE CAUSE	REMEDY
WILL NOT REFILL	1. POWER OFF TO BREWER	Press OFF/ON switch on control panel to determine if power is ON.
“ “	2. WATER SHUT OFF	Make sure water is ON.
“ “	3. ERROR MESSAGE	Brewer has shut down due to malfunction (See Service Fault Messages in this manual)
“ “	4.ON/OFF SWITCH (IF EQUIPPED)	Make sure ON/OFF Switch is “ON” and indicator is lit.
“ “	5. LIME BUILD UP ON PROBE(S)	Remove Level Probe and check for lime deposits on tip. Clean and reinstall.
“ “	6. REFILL VALVE OR CONTROL BOARD	Enter Service Tools and test the Refill Valve. As the refill valve activates, check the voltage across the coil wires. If voltage is present (120V), refer to wiring diagram and check the main wiring harness. If main wiring harness checks ok, the Control Board might need replacement.
REFILL DOES NOT SHUT OFF POWER “ON”	1. LIME BUILD UP ON PROBE	Remove Level Probe and check for lime deposits on tip. Clean and reinstall.
“ “	2. WATER LEVEL SENSING SYSTEM	Replace control board
“ “	3. REFILL VALVE OR CONTROL BOARD	Enter Service Tools and test the Refill Valve. As the refill valve activates, check the voltage across the coil wires. If voltage is present (120V), refer to wiring diagram and check the main wiring harness. If main wiring harness checks ok, the Control Board might need replacement.
REFILL DOES NOT SHUT OFF POWER “OFF”	1. REFILL VALVE	“ “

Troubleshooting the Heating Circuit

PROBLEM	PROBABLE CAUSE	REMEDY
WATER DOES NOT HEAT TO PROPER TEMPERATURE IMPORTANT: Make sure no temperature tests are taken before the display reads ready. Tank temperature must be stabilized before readings are taken.	1. DISPLAY’S ERROR MESSAGE	Brewer has shut down due to malfunction. See Service Fault Messages section in this manual.
“ “	2. WATER NOT TOUCHING MAIN (SHORT) LEVEL PROBE	Remove level probe and grommet. Look into hole on tank lid. Water must be within approximately one inch from top of tank.
“ “	3. WATER LEVEL PROBE SENSING SYSTEM	Check refill circuit. Heaters will not turn on if water is not grounding level probe.
“ “	4. TEMPERATURE PROBE	Check/replace
“ “	5. LIMIT THERMOSTAT OR TCO	Check/replace
“ “	6. TANK HEATER	Check/replace
SPITTING OR EXCESSIVE STEAMING	1. LIME BUILD UP ON TEMPERATURE PROBE, TANK OR TANK HEATER	Inspect probe and tank assembly for excessive lime deposits. Delime as required.
“ “	2. TEMPERATURE PROBE	Check/replace

Heating Circuit (cont.)

PROBLEM	PROBABLE CAUSE	REMEDY
SPITTING OR EXCESSIVE STEAMING (CONT.)	3. CONTROL BOARD	Check/replace
BREWER IS MAKING UNUSUAL NOISES	1. PLUMBING LINES	Plumbing lines should not rest on the counter top.
“ “	2. WATER SUPPLY	The brewer must be connected to a cold water supply.
“ “	3. LIME BUILD UP	Remove the tank lid and clean inside of tank with a deliming agent, if necessary.

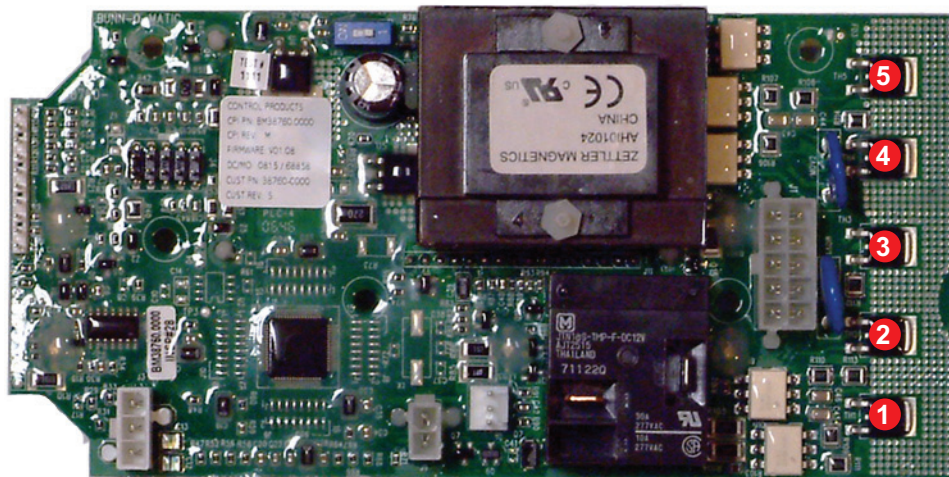
Troubleshooting the Brewing Circuit

PROBLEM	PROBABLE CAUSE	REMEDY
BREW CYCLE WILL NOT START	1. DISPLAY'S ERROR MESSAGE	Brewer has shut down due to malfunction. See Service Fault Messages section in this manual
“ “	2. NO WATER	Water lines and valves to the brewer must be open
“ “	3. NO POWER OR INCORRECT VOLTAGE TO THE BREWER	Check for voltage across the terminals at the terminal block.
“ “	4. ON/OFF SWITCH NOT IN THE "ON" POSITION	The indicator lamp must be lit
“ “	5. LOW WATER TEMPERATURE (BREW LOCKOUT IS ENABLED)	Allow brewer to heat until ready, or disable the brew lockout feature.
“ “	6. WATER NOT TOUCHING REFILL PROBE INSIDE TANK	Water must be in contact with refill probe before brew cycle will start.
“ “	7. MEMBRANE SWITCH	Check/replace
“ “	8. DISPENSE VALVE	Check/replace
“ “	9. CONTROL BOARD	Check/replace
CONSISTENTLY LOW BEVERAGE LEVEL IN THE DISPENSER OR BEVERAGE OVERFLOWS DISPENSER	1. BREW VOLUME NOTE: Volume adjustments must be made with sprayhead installed.	Calibrate Sprayhead
“ “	2. LIME BUILD UP	Inspect the dispense valve and sprayhead for excessive lime deposits. Delime as required.
“ “	3. DISPENSE VALVE	Remove dispense valve and clear any obstructions. Rebuild or replace valve if necessary.
BREW CYCLE STARTS, THEN ABORTS AND RETURNS TO MAIN SCREEN AFTER 20 SECONDS	1. LEVEL PROBES SHORTED	Ensure mylar shield(s) are installed on top cover
DIPPING FROM SPRAYHEAD	1. LIME BUILD UP	Inspect the tank assembly for excessive lime deposits. Delime as required.
	2. DISPENSE VALVE	Check/replace
WEAK BEVERAGE	1. SPRAYHEAD	A clean sprayhead must be used for proper extraction.

Brewing Circuit (cont.)

PROBLEM	PROBABLE CAUSE	REMEDY
WEAK BEVERAGE (CONT.)	2. WATER TEMPERATURE	Place an empty brew funnel on an empty decanter beneath the sprayhead. Initiate brew cycle and check the water temperature immediately below the sprayhead with a thermometer. The reading must not be less than 195°F (91°C). Adjust the temperature setting to increase the water temperature.
“ “	3. FILTER TYPE	BUNN® paper filters must be used for proper extraction.
“ “	4. COFFEE GRIND	A fine drip or grind must be used for proper extraction.
“ “	5. FUNNEL LOADING	The BUNN® paper filter must be centered in the funnel and the bed of grounds leveled by shaking gently.
DRY COFFEE GROUNDS REMAIN IN THE FUNNEL	1. SPRAYHEAD	Make sure sprayhead is present and holes are clear and unobstructed.
“ “	2. FUNNEL LOADING	The BUNN® paper filter must be centered in the funnel and the bed of grounds leveled by shaking gently.
LOW BEVERAGE SERVING TEMPERATURE	1. THERMAL SERVER/AIRPOT NOT PREHEATED BEFORE BREW CYCLE	Preheat server with warm water before next brewing cycle.

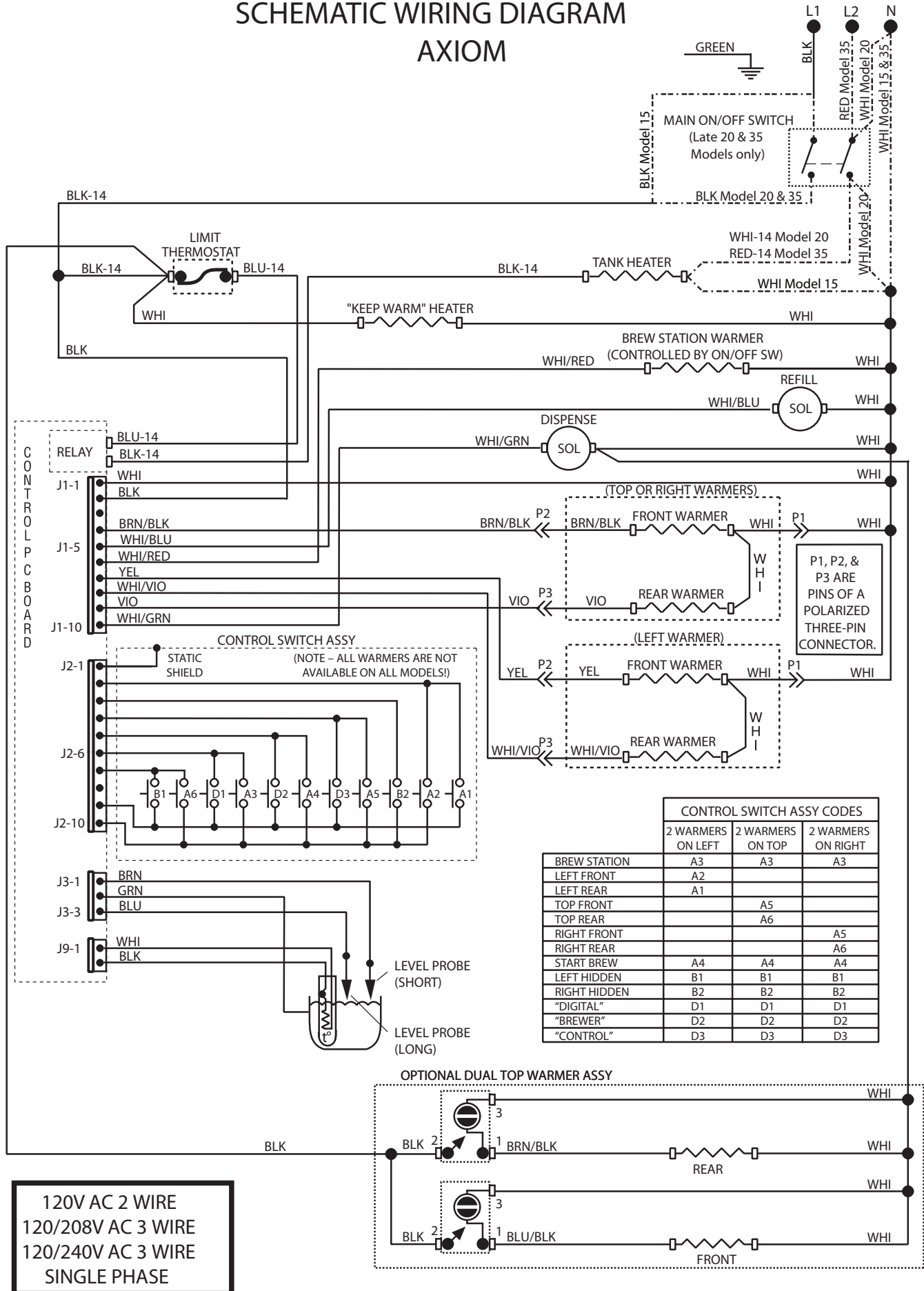
Triac Map



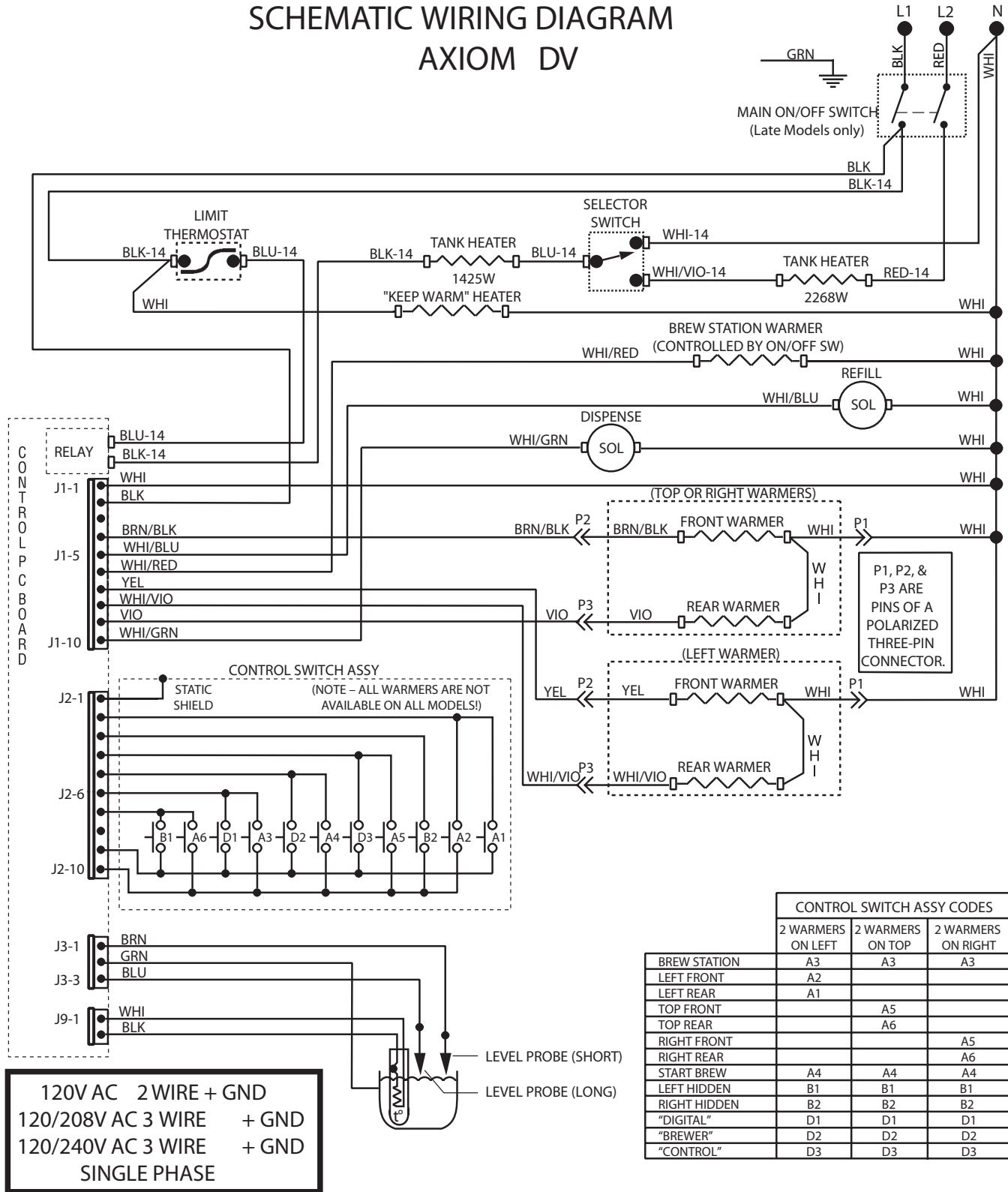
Viewing the Control board as if were installed in the machine on the right vertical edge a series of 5 triacs can be found. They are labeled TH1 to TH5 with TH1 being located at the bottom of the board and TH5 at the top.

- 1: TH1 Left Front Warmer
- 2: TH2 controls Brew Solenoid Valve
- 3: TH3 Right Rear Warmer
- 4: TH4 controls Refill Solenoid Valve
- 5: TH5 Main Warmer

SCHEMATIC WIRING DIAGRAM AXIOM



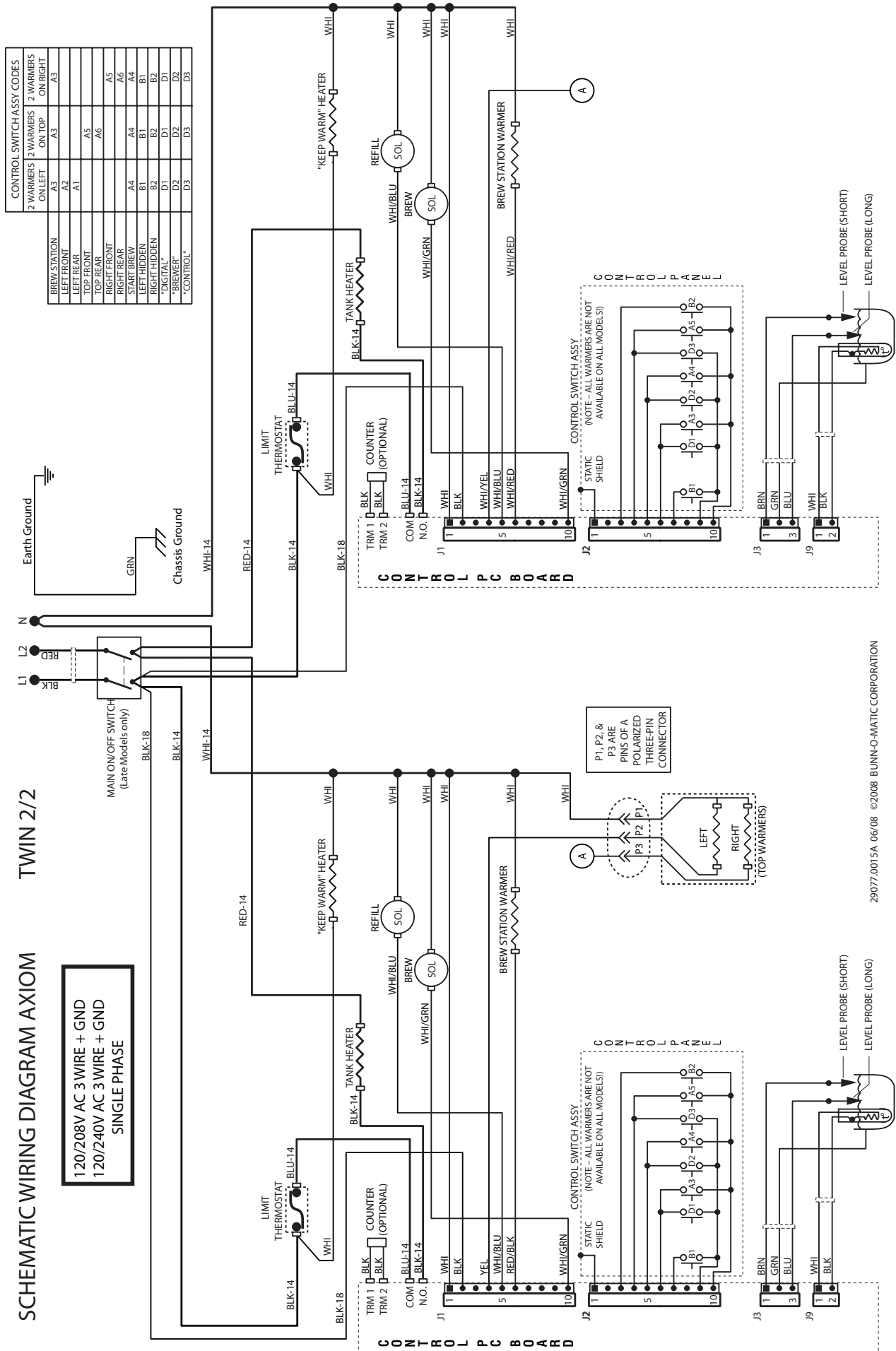
SCHEMATIC WIRING DIAGRAM AXIOM DV



SCHEMATIC WIRING DIAGRAM AXIOM

TWIN 2/2

120/208V AC 3 WIRE + GND
120/240V AC 3 WIRE + GND
SINGLE PHASE



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Additional Resources

Visit the BUNN Online Learning Center for technical information on BUNN equipment.

- Go to URL: <http://training.bunnserve.com/>
- Go to the menu bar and place your cursor over Courses, then choose "Commercial".
- Browse the list of available courses.
- From the course introduction, use the menu on the left to find instruction sheets, manuals, key learnings, checklists and updates on equipment.
- BUNN also has a wide range of instructional videos posted on the Online learning center and iTunes. You may subscribe to these videos via email, RSS, or as a podcast. After subscribing, you will be notified when a new video is posted.

QR Code Reader

For quick and direct access to technical resources on the BUNN Online Learning Center, you can download a QR-Reader application for your SmartPhone .

- Download QRReader Application for your SmartPhone.
- Open the QRReader application on your SmartPhone.
- Aim your SmartPhone Camera as if you are taking a picture of the QR code image. (image on the right)
- The QRReader Application will direct you to the BOLC, where you will have access to many resources relating to BUNN beverage equipment.



Technical Service & Support Contact Information

- Technical Service Department can be reached at: 1-800-286-6345
(Operators are available from 6:30 am to 5:30 pm CT. Monday - Friday)
Calls received after hours or weekends will go through our Telemessaging Service. You will then be connected to the first available service representative.
Email: tech.service@bunn.com

